**AS Unit 1: Basic Biochemistry and Cell Organisation**

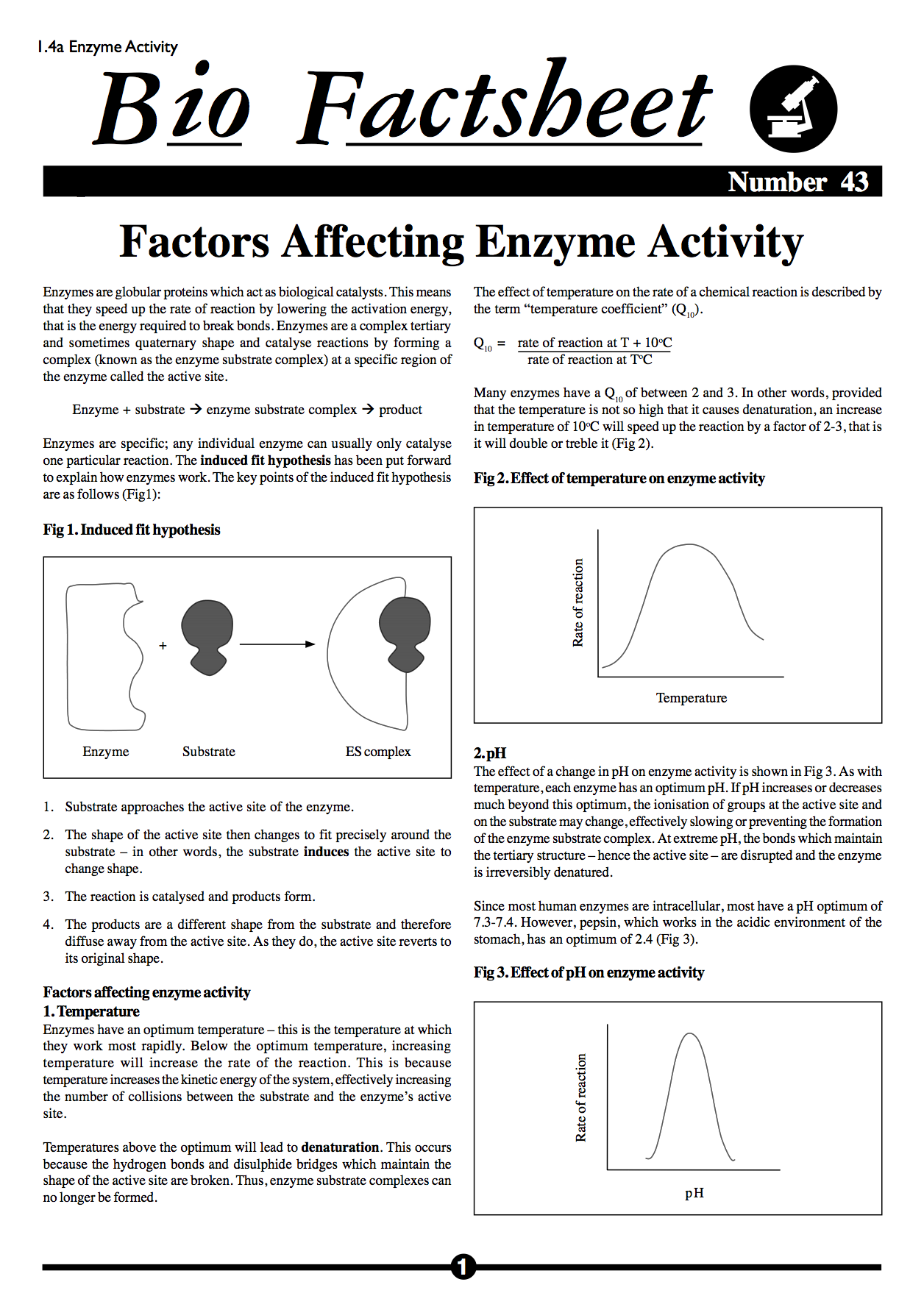
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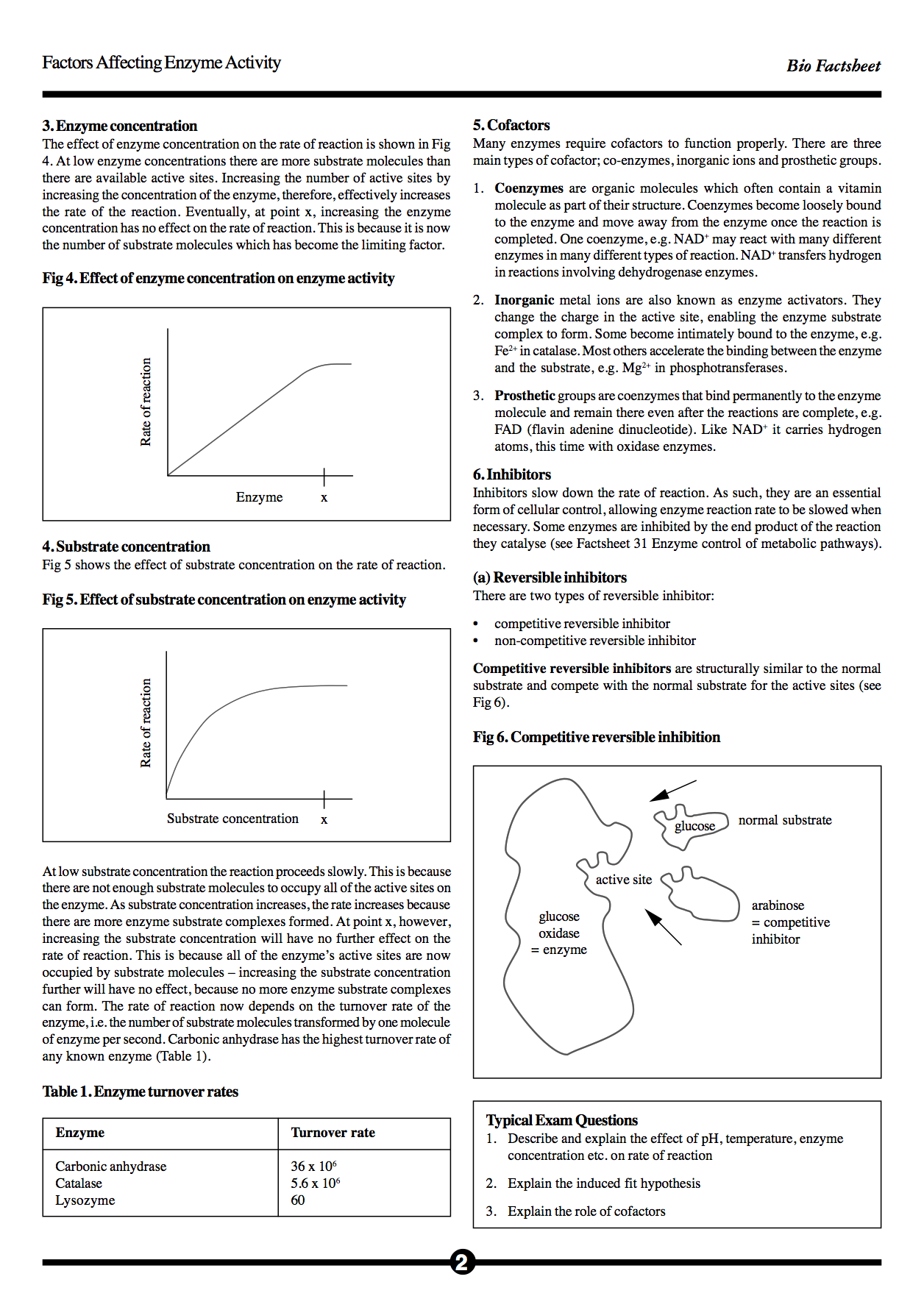
**Topic 1.4 Enzymes – Page 1**

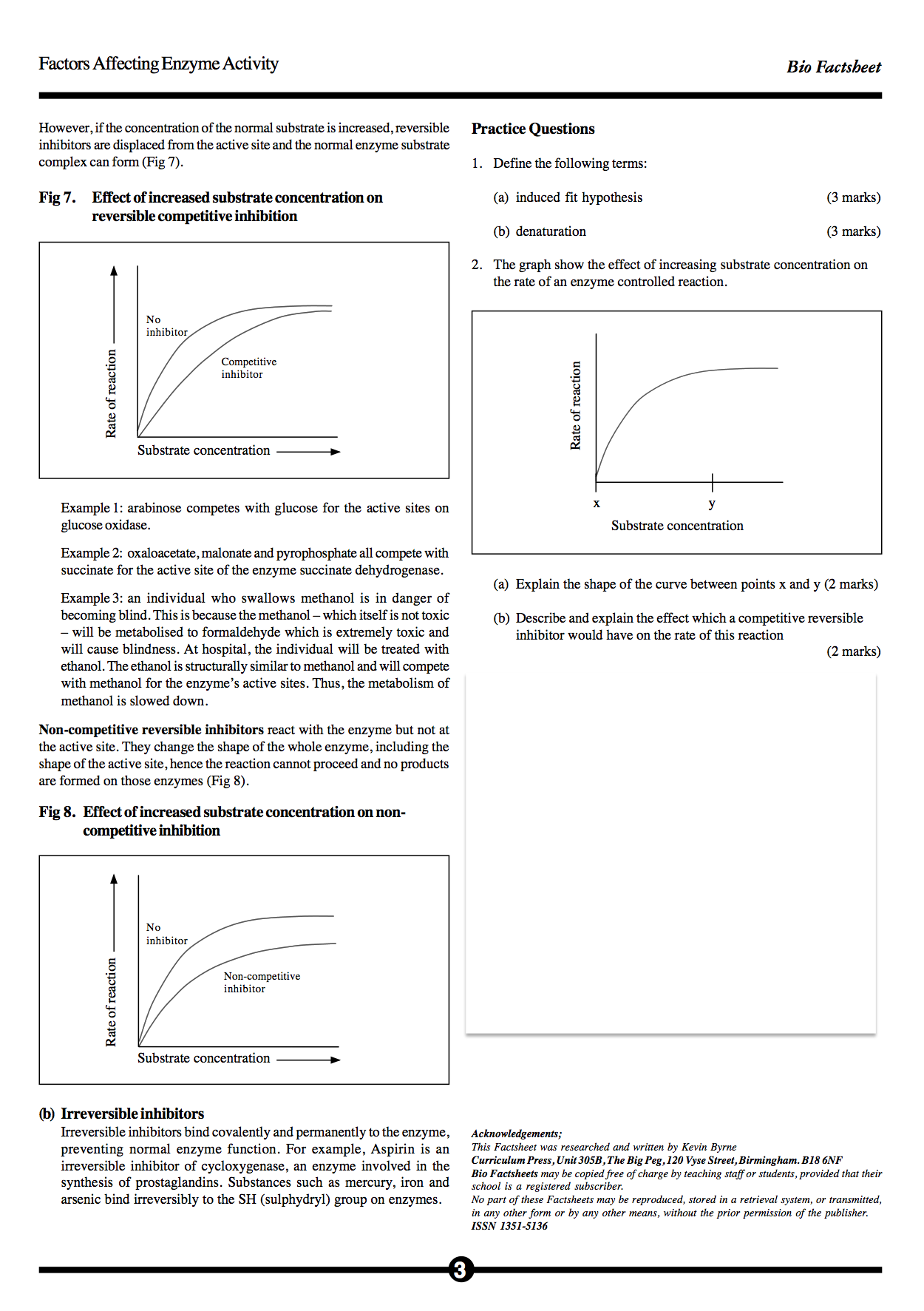
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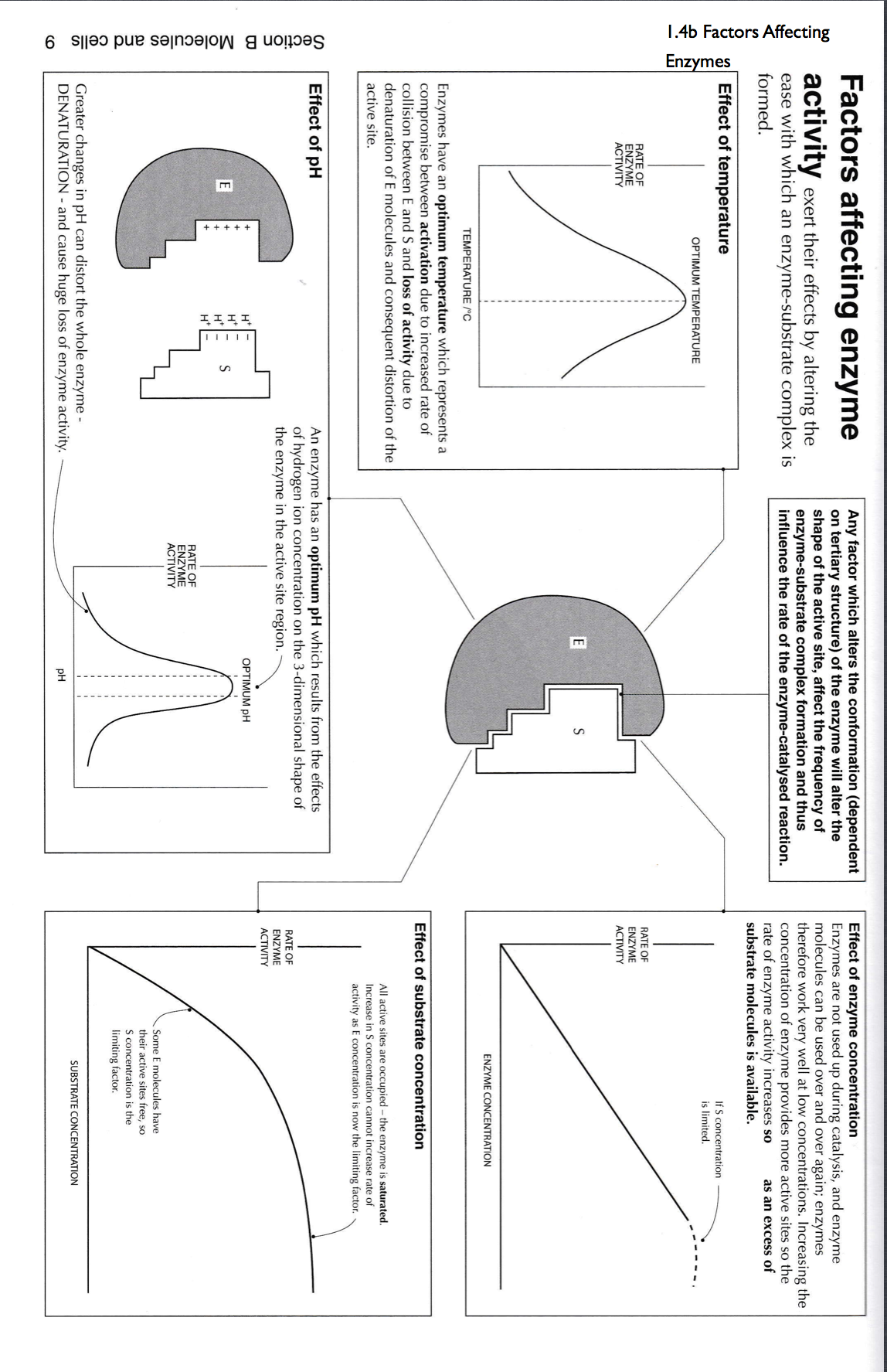
l. Introduction to Enzymes

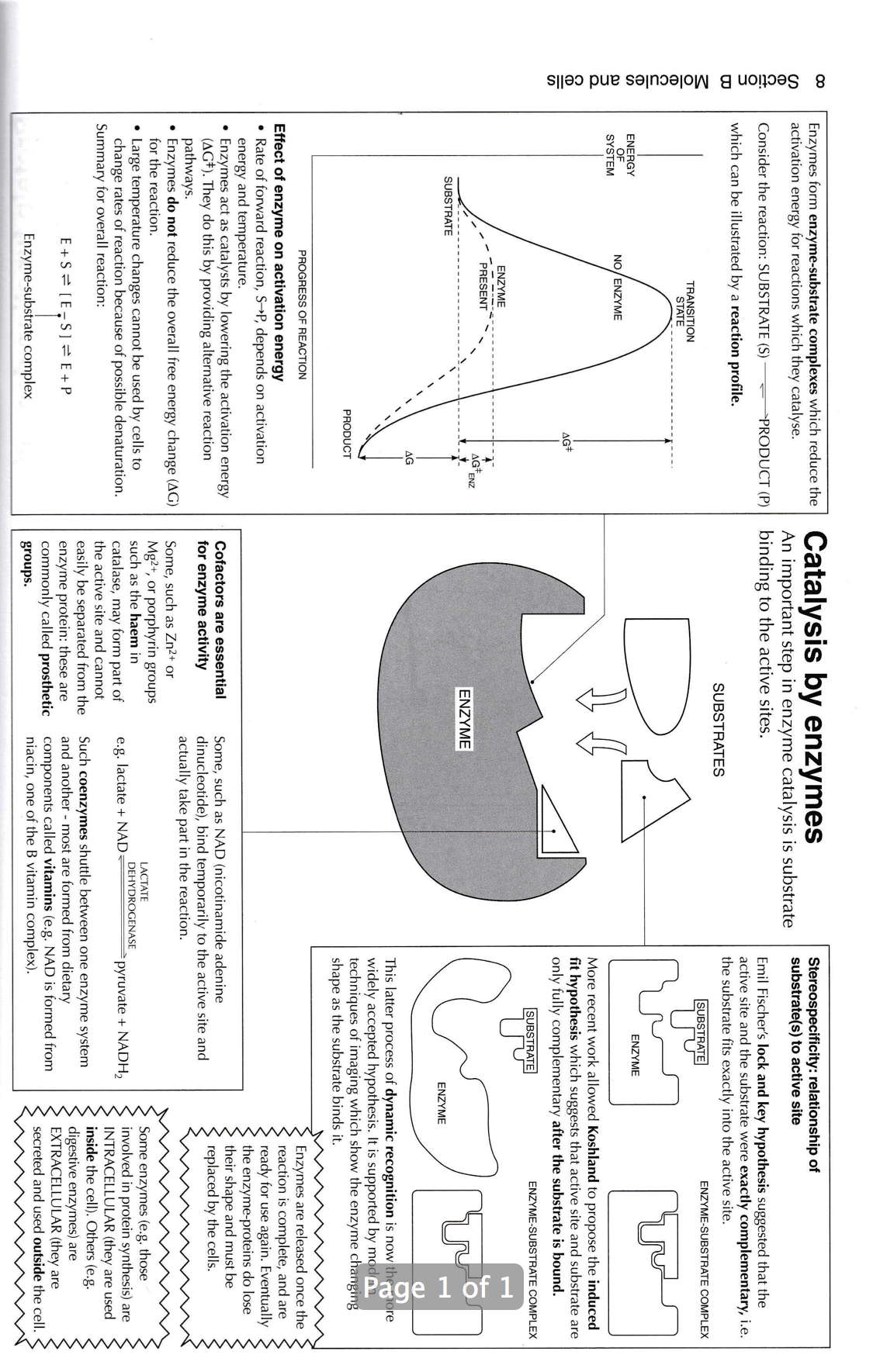
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|  |  | Completed |
| 1. | Go through the PowerPoint on Enzymes |  |
| 2. | Read the following:   * Rowlands p45-50 * Toole p35-44 * Hand out 1.4a Enzyme Activity * Hand out 1.4b Factors Affecting Enzymes * Hand out 1.4c Enzyme Catalysis |  |
| 3. | Complete the tasks on hand out 1.4d |  |











1.4d Questions on Enzymes

1. Enzymes are described as being globular proteins, what does this mean?
2. What bonds maintain the structure of a globular protein?
3. Enzymes are also described as biological catalysts. Why is the term biological used? What are the features of catalysts?
4. Draw an enzyme and label the active site. Annotate the diagram to explain the significance of the active site.
5. Draw an enzyme substrate complex and explain its significance.
6. Distinguish using diagrams the features of the two main proposed models for enzyme action.

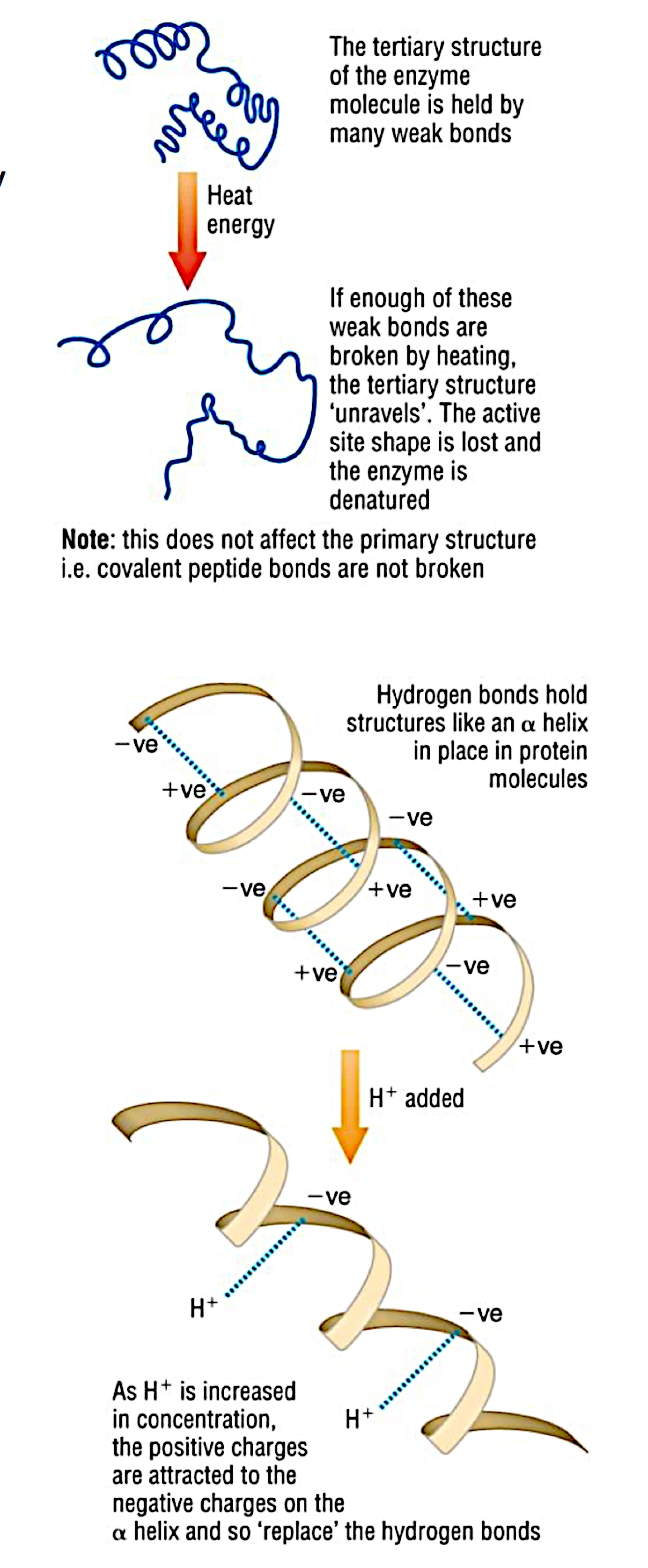
I The Lock and key

II The Induced Fit

1. Define the following terms:

* Activation energy
* Exergonic reaction
* Endergonic reaction
* Catabolic reaction
* Anabolic reaction

1. Sketch two energy profiles, one for an endergonic reaction and one for an exergonic reaction. Are anabolic or catabolic reactions exergonic?
2. Sketch a graph to show how substrate concentration affects the rate of an enzyme controlled reaction. Annotate the graph to explain what is happening at each stage; ensure that you use the term maximum turnover number.
3. Sketch a graph to show how temperature affects the rate of an enzyme controlled reaction. Annotate your graph to explain what is occurring at each stage. Make sure that you include the terms kinetic energy, successful collisions, bonds, optimum temperature, active site and denaturation.
4. What is the Q10 coefficient for enzyme reactions?
5. Sketch a graph to show how pH affects the rate of an enzyme controlled reaction. Annotate your graph to explain what is occurring at each stage.
6. Using the information on the beginning of the next page – explain what happens when an enzyme denatures. Explain how temperatures above the optimum or extreme changes in pH can bring about denaturation.



1. Sketch a graph to show what happens when the enzyme concentration is increased in an enzyme controlled reaction. On the graph draw 2 lines, one that shows what happens when substrate is fixed and one, which shows what happens when substrate concentration is in excess.
2. Metabolism is described as being a series of enzyme-controlled reactions. Give 3 examples of metabolic pathways found in humans.
3. What are meant by the terms intracellular and extracellular? Give 3 examples of enzymes that act on an intracellular level and 3 examples of enzyme that will act extracellular level.